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Defining Waste and Material Streams

SOLID WASTE

(Such as municipal solid waste, clear or black bag waste, trash.)

What is Solid Waste?

- This waste category encompasses the vast majority of hospital waste, including food, packaging, diapers, gloves and other trash, which while similar to hotel or municipal waste, has a higher plastic content, due to various disposable medical devices like IV bags, tubing, foley bags and more.
- This material is typically sent to a solid waste landfill, a waste-to-energy recovery technology or municipal waste incinerator.
- The volume and cost data is provided by the waste hauler through compactor weights, by the bin or dumpster weights. When pounds or tons are not provided by the vendor, conversion of cubic yards can be done through a standardized conversion factor or estimates of a facility's sampling of that material. Conversion factors are a last resort, due to the rough estimate and potential error in calculation. Please see standardized conversion factors at the end of the document.

Costs

Costs can often be calculated through invoice review. After identifying the various vendors and types of materials, invoices are gathered and with calculator in hand, numbers crunched. This is not a dumpster dive. Invoice review is the easiest way to gather true costs for material removal. These costs may include:

- Container (dumpster/roll-off) rental.
- Pick-up or hauling fees and tipping (dump) fees.
- Taxes and fuel surcharges.
- Does NOT include labor costs.
- Check contracts and invoices because these fees are sometimes billed separately from pull invoices.

Special Considerations

- a. If the facility is treating or disinfecting medical waste onsite and then sending it out with solid waste, track the weight of that waste stream separately and add it to regulated medical waste (RMW) totals rather than solid waste totals, if possible. If it's commingled after on-site treatment, subtract this amount from the reported compactor removal total.

- b. Track the weights of construction and demolition (C&D) debris from construction or renovation projects (larger than 1,000 square feet) separately from solid waste weights and report in separate C&D table in this document. Any project smaller than 1,000 square feet or dumpsters/roll-offs that typically capture bulky materials not from a specific construction project can be included in solid waste weight totals, if discarded as waste or in recycling numbers if recycled.
- c. When scrutinizing compactor weights, know that a full 35-cubic-yard compactor of hospital waste can achieve eight tons of material (especially if segregating bulky but light corrugated boxes). If boxes are going out below three tons or so, this is an opportunity to reduce costs by ensuring that containers are removed when full and the facility is not charged for less than full compactors. Gauges can be installed to measure fullness and aid in the proper pick up schedule. While some rural locations can set up an “on-call” methodology for pick-up, most urban environments cannot do this, due to more rigid pick-up schedules and a slower turnaround, due to congestion and traffic navigation. Proceed with caution as reducing the number of under-filled containers can risk an over-filled container.

REGULATED MEDICAL WASTE

(also referred to as RMW or infectious waste or red bag waste.)

OSHA’s Definition of Regulated Medical Waste:

Regulated waste means liquid or semi-liquid blood or other potentially infectious materials (defined below), contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed, items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling, contaminated sharps, and pathological and microbiological wastes containing blood or other potentially infectious materials.

Other potentially infectious materials means (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

What is Regulated Medical Waste?

Regulated medical waste (RMW) is material determined by state and federal regulations, [OSHA Bloodborne Pathogen Standard](#), and requires segregation, special handling and treatment through incineration or alternative treatment technology. This “red bag”, infectious, biohazardous, “special medical waste” or materials otherwise collected and marked with a biohazard symbol may include but not be limited to sharps, items saturated, soaked or dripping with blood, microbiological waste, pathological and anatomical waste and *non-RCRA/trace* chemotherapy waste bound for medical waste incineration. In the surgical setting, saturation of certain fluids (cerebrospinal fluid, pleural fluid, amniotic fluid and more) also meet the definition. “Saturated, soaked and dripping” are key descriptors. Urine, feces, vomit and isolation waste (unless isolated due to a CDC Class 4 definition like Marburg or Small Pox) are not regulated medical waste. The actual definition for RMW shall be identified as a team with infection control and others and regulations vary

by state. RMW can be reported in one place but it's important to recognize that there are subsets of this waste stream. There is RMW that is incinerated but it can also be treated in an alternative treatment technology like autoclave. This *does include* any medical waste treated or disinfected *onsite* and then sent to a solid waste landfill, waste-to-energy facility or municipal waste incinerator. Regulations vary state to state. Regulatory compliance comes first and state resources can be identified through this link: <http://hercenter.org/rmw/rmwlocator.cfm>.

Incinerated Regulated Medical Waste

Incinerated RMW can be a subset of total regulated medical waste and include any waste in the above category that is sent out for medical waste incineration ONLY. This may include:

Pathological/Anatomical Waste – Most states either require incineration of pathological waste, (which includes tissues from surgery and autopsy) or incineration is the default disposal method for all RMW. This is sometimes packaged separately from other medical waste and close scrutiny of medical waste removal manifests identify its end treatment location.

Trace Chemotherapy Waste – This stream encompasses materials contaminated with chemotherapy formulations or spill residual that does NOT meet the definition of RCRA hazardous waste, usually because it is less than three percent of the original volume of the chemotherapy. This can include items such as gloves, disposable gowns, empty vials, and empty intravenous (IV) solution bags and tubing. These items are typically collected in disposable yellow bins or poly bags labeled as “trace chemotherapy.” To be considered “trace” chemo waste, containers must be “empty” as per state and federal hazardous chemical waste definitions. Making the process more difficult is the fact that not all chemotherapeutic agents are considered RCRA hazardous, despite having many of the same characteristics as those that currently fall under RCRA. Practice Greenhealth recommends that all chemotherapy agents in “bulk” quantities, including tablets and capsules, be treated as RCRA hazardous waste and be handled and disposed of with the same care.

Other Non-RCRA Hazardous Pharmaceutical Wastes – including pharmaceuticals that are not a listed or characteristic hazardous waste but may still be on the NIOSH hazardous drug list or medications such as antibiotics, birth control pills and IV formulations. Some vendors collect this in either a blue or white rigid container labeled Non-RCRA Pharmaceuticals for incineration at either a regulated medical waste incinerator or a waste-to-energy incinerator. (The State of California does require this waste stream to be labeled as “biohazardous” and incinerated at a regulated medical waste facility.)

All Regulated Medical Waste – If ALL of the facility's RMW is incinerated, it would be tracked in this category.

Sharps – All sharps, whether collected in reusable containers or disposable containers, should be added to the regulated medical waste total. (If using a reusable container, the vendor provides weights of its contents, not weight of containers themselves.)

Not sure? Ask the hauler or look at waste manifests.

Costs

This includes all costs for disinfecting/treating or disposing of medical waste, including:

- Reusable shipping containers, 4.5 cubic yard cardboard box, bag charges, or other shipping method.
- Pick-up or hauling fees, and tipping fees.
- Taxes and fuel surcharges.
- Does NOT include labor costs.
- Sharps management services (disposal portion, not labor).

Special Considerations

- a. If RMW is treated onsite before disposal and placed into solid waste, this amount shall be included or estimated as part of the RMW waste stream. If this waste stream is not currently being tracked, weigh a sample set of containers/carts before they are treated onsite and track the number of containers/carts treated. This can help estimate how much waste is treated on-site, even if it's then commingled with solid waste. This does not mean treated waste requires regular weighing, but estimates can help track RMW generation estimates. On-site treatment shouldn't loosen efforts on minimization.
- b. Facilities may use multiple haulers for different regulated medical waste streams. Please provide a total aggregate weight.
- c. If RMW is treated onsite before disposal, facilities may attribute energy, water and permitting costs for the medical waste treatment technology if sub-metered and tracked appropriately.
- d. RMW costs are usually easy to calculate because most facilities pay by the pound. If not, a sampling of shipping containers can be weighed for an average weight per container.
- e. Those using a sharps service should ask the vendor to identify the costs associated with the waste portion, so that labor is not included in the calculation. (Many sharps management service fees include a trained technician.)

RECYCLABLES

What is Recycling?

This refers to all wastes that are removed and tracked, bound for recycling—or to be turned into a feedstock for another product. In general, this does *not* include items bound for reuse. (It does NOT include pallets, reusable dishware, reusable linen, and more). If the facility does not weigh all of its recyclables, a sample weight may determine good quality estimates of total weights. For example, weighing a 96-gallon toter of mixed office paper can provide an estimate for calculating number of toters removed per pick up. Examples of recycling include confidential paper, mixed-office paper, mixed plastics, corrugated boxes, glass and steel cans from the kitchen. It can also include electronics and mercury-containing equipment like fluorescent light bulbs and computer monitors. (See Universal Waste Section for recycling of mercury-containing devices and equipment.)

Costs

- This includes all costs for sending materials out for recycling including:
 - Container (dumpster/roll-off, toters) rental, pick-up or hauling fees, tipping fees, taxes and fuel surcharges.
 - Any rebates for material. (If the organization receives rebates for recycled material, subtract from total cost or enter a negative number if the organization is making a profit from recycling streams.)
 - Does NOT include labor costs.

Special Considerations

- a. See Recycling Table at the end of the guidance document for materials to be included in recycling weights and standard volume-to-weight conversion factors for different materials. Use the Recycling Table to calculate all recycling program amounts and then use this number, along with any recycled solvents or universal waste for the recycling section of the table.

- b. Make sure to include any recycling from HIPAA compliance. Check with your confidential paper destruction company to ensure they are recycling the paper.
- c. Universal waste and laboratory solvents may be recycled at the facility. While these are considered “hazardous” materials, if they are recycled, include them in recycling data. Examples could be xylene or alcohol for distillation, electronics recycling, batteries, ballasts and fluorescent light bulb recycling. See Universal Waste Section for details on this category.
- d. Practice Greenhealth considers composting as recycling so if you are collecting food waste for composting, add the weight to recycling aggregate.

HAZARDOUS WASTE

What is Hazardous Waste?

This includes materials that meet the definition of hazardous waste under the US EPA’s Resource Conservation and Recovery Act (RCRA) or is sent out for treatment as hazardous waste as a proactive and environmentally protective measure. This includes but is not limited to RCRA pharmaceuticals, mercury spill clean-up, solvents, refrigerants, oil and other regulated materials.

Hazardous waste being handled as a universal waste should not be tracked in this category if it is recycled, but crushed bulbs would be tracked as hazardous waste.

RCRA Pharmaceutical Waste (component of hazardous waste)

This is a subset of total hazardous waste weight and some hospitals have not yet implemented this regulatory requirement. This includes any pharmaceutical waste that is collected, managed and disposed of as RCRA hazardous waste. (Some facilities add other pharmaceuticals here, as a best management approach.) This includes any characteristic hazardous waste (ignitable, toxic, reactive, corrosive) and P- and U-listed wastes. It also typically includes any bulk chemotherapeutic waste. In many facilities, this is collected in a black rigid container labeled RCRA-Hazardous Pharmaceuticals. This may also include the waste stream known as dual-waste which includes hazardous wastes that are also considered infectious (or regulated medical waste) such as sharps, which are often collected in either a black rigid container with both a red biohazard symbol and hazardous waste label or a purple rigid container labeled dual waste—RCRA and biohazardous.

Costs

Because facilities often have multiple departments managing these wastes independently, it is important to do due diligence to ensure all costs are tracked centrally (in addition to locally). This includes all costs for treatment and disposal of RCRA hazardous waste or materials treated as RCRA hazardous waste for proactive or environmentally protective purposes, and should include:

- Container removal (five-gallon can, 55-gallon drum, lap pack, spill residual, pharm waste containers).
- Rental, pick-up or hauling fees.
- Tipping fees, taxes and fuel surcharges.
- Any crushed bulbs that are now deemed hazardous material.
- Does NOT include labor costs.

Special Considerations

- a. This includes assessments of laboratory, dental, research areas, engineering, facilities, biomedical engineering and other departments to ensure that categories are tracked centrally (in addition to locally). Accounts payable may be able to flag any stand alone accounts, for example.
- b. If the facility is tracking hazardous waste in gallons, the conversion factor of 7.5 lbs. per gallon may be used. (See conversion factors at end of document.)
- c. All hazardous wastes are required to be manifested prior to removal and the haulers have to be able to provide records on exactly what is removed, how much and how it is discarded.
- d. Ensure differentiation between trace chemotherapeutic waste (often collected in a yellow or white rigid container with a red biohazard symbol) that is NOT RCRA-regulated and is bound for REGULATED MEDICAL WASTE INCINERATION. This is in contrast to bulk or more than trace amounts of chemotherapy waste that qualify as RCRA-hazardous or should be treated as such via a HAZARDOUS WASTE treatment and disposal facility—typically a hazardous waste incinerator. There are currently only eight chemotherapy drugs that are formally “listed wastes” per RCRA requirements (from 1976) but there are over a hundred chemotherapy drugs in use at hospitals today, which are typically managed as RCRA-hazardous. Include all pharmaceutical/chemotherapy wastes managed as RCRA-hazardous in this total. If the facility collects ALL pharmaceuticals (beyond compliance) as hazardous waste as a proactive and environmentally protective measure, then the total weight would be included in this number. Meaning, the report should demonstrate reality, so if a facility goes beyond regulation, it shall be reported as such.
- e. This number does NOT include unused medication which is returned to the vendor through reverse distribution.
- f. Universal waste is a subset of hazardous waste where materials are handled, labeled and stored in a particular manner then sent for hazardous waste recycling. Because it is being handled as universal waste, it falls out of the hazardous waste totals and should be tracked separately. Universal wastes include fluorescent lamps (when recycled—NOT when crushed), batteries, certain electronics, mercury-containing equipment and pesticides. See universal waste definition below.
- g. If this category is left blank, it will raise a red flag. Even if weights are in fractions of tons, it should be tracked as a portion of total waste.
- h. What are controlled substances? (addictive pharmaceuticals, narcotics)

CONTROLLED SUBSTANCES

What are controlled substances?

(addictive pharmaceuticals, narcotics)

This waste category encompasses certain pharmaceuticals that listed by the Drug Enforcement Administration (DEA) as drugs of abuse and must be managed very strictly based on the DEA regulations. The goal of Practice Greenhealth is to keep these out of water ways through the avoidance of flushing or draining.

While wasted controlled substances are either a subset of hazardous pharmaceutical waste or nonhazardous pharmaceutical waste, this section is intended to provide clarity and ensure this waste stream is captured in an overall waste management strategy. Controlled substances are classified into five schedules based on their potential for abuse.

Controlled Substance Schedules:

- Schedule I includes drugs that have no accepted medical use, such as heroin.
- Schedule II drugs are used medically but have high abuse potential, such as morphine, and their purchase, storage, and use requirements are very strictly monitored.
- Schedules III through V are drugs with decreasing abuse potential, all the way from sedatives to cough suppressants, such as codeine.

Chloral hydrate (U034) is a Schedule IV (CIV) drug and the only controlled substance in common usage that is also a RCRA listed hazardous waste if discarded. (Several other formulations of controlled substances, such as testosterone gel, meet the ignitability characteristic and would also be considered a hazardous waste if discarded.

On October 9, 2015, the DEA's Drug Disposal Act took effect. Controlled substances within the pharmacy's inventory, such as expired drugs, must be sent to a reverse distributor to eventually be incinerated through a witnessed burn. However, due to the difficulty in routing small amounts of controlled substances to an incinerator for drug waste generated during patient administration, DEA issued a clarification letter on October 17, 2015 that basically states once a drug has been administered to a patient, any remaining drug, such as partial IV, vial, or syringe, is then out of the controlled substance loop. DEA encourages health care facilities to manage this drug wastage in a manner that prevents diversion and is compliant with all federal, state, local and tribal regulations. The facility can then utilize a device that sequesters the drug, such as Cactus Smart Sink, or can sewer the drug if it obtains permission from the local publicly owned treatment works and there is no other state or local prohibitions against sewerage drugs. The cartridge from a sequestering device can be disposed in the hazardous or non-hazardous pharmaceutical waste container, as appropriate. Additional information can be found on the DEA Diversion website at http://www.deadiversion.usdoj.gov/drug_disposal/.

Costs

The sewerage of controlled substances doesn't capture the disposal costs of controlled substances. Hospitals are investigating processes to best capture these materials prior to their removal. Costs for controlled substances disposal include engineering controls (such as Cactus Smart Sink). Other costs like incineration can often be calculated through invoice review.

UNIVERSAL WASTE

What is Universal Waste?

Certain mercury-containing equipment like fluorescent light bulbs, batteries, some electronics and pesticides—while defined as RCRA-hazardous by definition—are considered “Universal Wastes” and have been approved for removal as recycling and do not count toward hazardous waste generator status. The definition of Universal Waste varies by state. Not sure what counts as Universal Waste in a given state? Check with the Universal Waste vendor for data or check on state regulatory guidance at the Healthcare Environmental Resource Center. While Universal Waste is intended for recycling, it has full regulatory oversight regarding collection, storage, signage and transport.

Costs

Because facilities often have multiple departments managing these wastes independently, it is important to do due diligence to ensure all costs are tracked centrally (in addition to locally). Accounts payable may be able to flag any stand alone accounts. This includes all costs for hauling and recycling or remanufacturing of Universal Wastes, and should include:

- Any container (dumpster/roll-off).
- Rental, pick-up or hauling fees.
- Tipping fees, taxes and fuel surcharges.
- Does NOT include labor costs.

Considerations

Does the facility use a lamp crusher?

If so, cease the use of a lamp crusher as soon as possible, as the act of crushing fluorescent lamps releases mercury vapor into the atmosphere and is not recommended by the EPA or Practice Greenhealth. Crushed lamps must be removed as hazardous waste by a licensed hazardous waste hauler. Learn more: <http://www.epa.gov/osw/hazard/wastetypes/universal/drumtop/drum-top.pdf>

If this material is recycled, then it can be added to the recycling section of the table.

CONSTRUCTION AND DEMOLITION DEBRIS

What is Construction and Demolition Debris?

Construction and Demolition Debris Landfilled or Burned

Construction and Demolition of projects larger than 1,000 square feet shall be tracked separately. This material is known to be highly recyclable, but some remains a waste material. Through careful contracting, Construction and Demolition (C&D) recyclers can achieve up to a 90 percent recycling rate for construction materials during demolition, renovation and new construction. This material may include bricks, cement, wood, metal, window framing, ceiling tiles, carpeting and more. While this is important to track, it does NOT go in the combined waste table and shall be tracked separately. Vendors and contractors can track the percentage recycled or reused versus discarded as waste.

If the organization is tracking C&D recycling in pursuit of LEED points, this tracking is often set up in advance through part of the contract management process.

Considerations

This includes all costs incurred for disposal (not recycling) of construction and demolition waste for projects totaling more than 1,000 square feet, including:

- Container (dumpster/roll-off).
- Rental, pick-up or hauling fees, tipping fees.
- Taxes and fuel surcharges.
- Does NOT include labor costs.

Construction and Demolition Debris Recycled or Reused

Considerations

This includes all costs incurred for recycling and donation for projects totaling more than 1,000 square feet including:

- Container.
- Rental, pick-up or hauling fees, tipping fees.
- Off-site sorting.
- Taxes and fuel surcharges.
- Does NOT include labor costs.

Definitions and Measurement

In order to properly measure materials and wastes, standardized stream identification and measurement is critical. This is a moving target, as new programs continuously come upon the scene and regulations change. Each section defines a certain key waste stream. The color corresponds to the color coded table to help understand where to place the data for each stream in the table on page five in the How-to Guide. Actual weights are so important for the benchmark report and its value. Overestimating will help no one. Here is the hierarchy for waste and material data collection.

- Facility weighs prior to removal. 
- Contracted service providers provide ticketed scale weights, and report poundage of material removed by type. 
- Service providers provide weights with invoices. 
- Facility weighs a sampling of the material (96-gallon toter, corrugated bale, 64-gallon toter, five-gallon pail) and estimates, based on number of containers and average weight. 
- Facility uses conversion factors. 

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